

Request for the use of the Doppler on Wheels (DOW) NSF Facility for Education
DOW Observations of New England Winter Storms (DOWNEWS 2)

Nolan T. Atkins
Department of Atmospheric Sciences
Lyndon State College
Lyndonville, VT 05851
7 September, 2011

1. Introduction

It is proposed herein to deploy a Doppler on Wheels weather radar (either DOW 6 or 7) during the period from 30 January – 17 February, 2012 to collect data on winter storms affecting northern New England. This time period coincides with the climatological maximum of winter storms affecting northern New England. The proposed deployment will run concurrently with the Remote Sensing ATM 3110) course offered at Lyndon where the theory and application of Doppler weather radar is taught. The course typically enrolls 15 undergraduate students. This would be the second consecutive year deploying the DOW for DOWNEWS.

During the proposed deployment, Lyndon students will: (1) be introduced to the components and operation of the DOW radar; (2) plan, forecast, and lead the deployment of multiple missions designed to collect data on winter storms; and (3) analyze the data as part of small group projects that will be presented in the Remote Sensing course, the annual Northeastern Storm Conference, and possibly the American Meteorological Society (AMS) Student Conference held concurrently with the Annual Meeting. K-12 students and teachers from nearby schools will also have the opportunity to learn about the operation and use of the DOW radar.

2. Proposed use of the DOW Radar

DOW missions will focus on collecting data in two different precipitation scenarios. The first is the stratiform precipitation region where we often observed numerous precipitation types (e.g., snow, sleet, freezing rain, and rain). The horizontal and vertical structure of this precipitation region will be sampled. We are very interested in collecting dual-polarization data on the vertical structure and evolution of this precipitation region when different precipitation types are present. A good deployment location has been identified for this precipitation scenario based on our experience deploying the DOW last winter.

The second precipitation scenario is orographic enhancement in either northwest or southeast flow. Significant enhancement is often observed west of the Green Mountains in northwest flow and east of the White Mountains in New Hampshire in southeast flow. Large contrasts in precipitation amounts from mountain to adjacent lowland areas are common in both flow regimes. Both mountain ranges are easily assessable from Lyndon (within 100 km). A good deployment location was identified last winter near Richford, VT for northwest flow events.

For all of our deployments, we anticipate using our Vaisala rawinsonde system to collect soundings at or near the radar deployment site. This data will be combined with the radar observations to help with the radar data interpretation.

Before the radars arrive on campus, students will be required to devise scan strategies for both precipitation scenarios. Students will need to consider how to set the PRF, antenna rotation rate, scan mode (PPI vs RHI), and scan angles to collect quality, useable data. Inevitably, the scan strategies will need to be modified by the students in the field. For example, they will need to think about appropriate PRFs to use in order to eliminate any velocity folding or second trip contamination.

Students will also be responsible for specific radar deployment site selection. While two good deployment locations were found last winter, others will need to be identified for precipitation scenarios not sampled in 2011.

Students enrolled in our Analysis and Forecasting course (ATM 3332) will also be involved with this project. They will provide critical forecast and nowcast guidance in the 0-48 hr time frame in terms of where and when each of the two precipitation scenarios will be viable for data collection.

Students learn how to use the NCAR/EOL SOLOii software package in the lab portion of our Remote Sensing course. Therefore, this will be the tool used for subsequent data analysis. The PI has extensive experience using SOLOii to analyze Doppler-radar data.

The PI has experience working with DOW6 last winter. It would be helpful for a DOW technician and driver to be present the first couple of days of the project to help with radar training.

3. K-12 Outreach

The primary means by which the DOW will be introduced to the local K-12 community will be through onsite demonstrations and presentation, offsite visits to local K-12 schools, and a presentation to prospective students interested in the Atmospheric Sciences program at Lyndon. CSWR staff will give most of the presentations, augmented by the PI.

Facility Request Form for Educational Activities

Part I: General Information

Requestor Name	Nolan Atkins
Institution and Address	Lyndon State College PO Box 919 Lyndonville, VT 05851
Phone and Email	802-626-6238 Nolan.atkins@lyndonstate.edu
Faculty Advisor Name (if student requestor)	
Institution and Address	
Phone and Email	

Part II: Project Description

Project Title	DOW Observations of New England Winter Storms (DOWNEWS 2)
Project Location	Lyndonville, VT
Start and End Dates of Field Deployment	30 January – 17 February, 2012
NSF Facilities requested (type and # of systems)	DOW 6 or 7
Number of Expendables requested (if applicable)	

Part III: Educational Activities Description

Number of students involved	Graduate: 0 Undergraduate: directly, 14, indirectly, approximately 75
Desired training activities conducted by Facility Staff incl. time in the field	Two days with DOW technician and driver on radar operation and driving the vehicle
Desired teaching activities conducted by Facility Staff incl. time in the field	One general talk on DOW-related research
Additional special requirements that pertain to Facility support	
Ancillary/Oppportunistic K-12 Outreach Activities ¹	At least one talk to be given at local high school. LSC staff may also expose local elementary school students to DOW.

Part IV: Operational Requirements

¹ Please note that NCAR and NSF **strongly** encourage additional educational activities that focus on K-12 audiences to expand NSF Facilities outreach even further.

Please specify data access needs (e.g. real time)	
Please specify data analysis needs	
Please specify communications needs	